Space Weather Forecast

Issued on Wednesday, 05 July 2023 at 01:13 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 Radio Blackouts likely. G1/Minor Storm to G2/Moderate Storm possible late 06 July or early 07 July with CME arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with a single Moderate-class flare originating from the largest and most magnetically complex sunspot region, which is close to the northwest limb. There are currently nine sunspot regions on the Earth-facing disc. The aforementioned region near the northwest limb remains the largest and most complex on the disc. This is becoming more difficult to analyse as it continues to rotate closer to the northwest limb. Another region in the southeast maintains a slightly complex magnetic structure. A further region in the northeast has continued to show minor growth and has a partially north-south aligned magnetic structure, perhaps increasing instability. The remaining regions on the disc are relatively small or simple.

A recent Coronal Mass Ejection (CME) likely associated with a filament disruption (arc of plasma) near a sunspot region in the southeast quadrant has been analysed and shows it is Earth-directed. This is likely to arrive at Earth either late on the 06 July (day 2) or early on the 07 July (day 3).

Solar Wind / Geomagnetic Activity: The solar wind has been at mostly background levels. Wind speeds have varied between 340-410 km/s. The Interplanetary Magnetic Field was weak throughout, while the north-south component also varied weakly. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is likely, with a slight chance of further Strong flares. The risk is mostly coming from the large sunspot in the northwest, and reduces as this region rotates off the visible disc.

Solar Wind / Geomagnetic Activity: A CME which occurred earlier on 04 July has been analysed and is Earth-directed. The CME is likely to arrive at Earth late on the 06 July (day 2) or early on 07 July (day 3). Solar wind speeds are currently at ambient levels. A connection to small CH20/- in the southwest may occur early on day 1 (05 July), however any fast wind from this feature is expected to be weak. The next fast wind from a large coronal hole currently near centre disc is likely to arrive either on day 3 (07 July) or day 4 (08 July), with solar winds increasing to between 500-600km/s. Geomagnetic activity is expected to be mostly Quiet to Unsettled at first, increasing to Active to G1/Minor Storm with any CME arrival, with a chance of G2/Moderate Storm and a slight chance of G3/Strong Storm activity. As the CME effects wane,

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Unsettled to Active conditions may be prolonged by any fast wind later in the period, with a chance of G1/Minor Storm intervals.

Energetic Particles / Solar Radiation: Solar radiation has a slight but declining chance of reaching the S1/Minor Storm threshold throughout the period, mainly from the large region in the northwest. The risk reduces as this rotates away from the visible disc.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	35	60
Strong	G3	No	1	1	5	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	40	30	20
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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